

THE CLAIMS

What is claimed is:

- 5 1. A method of thinning a wafer made of semiconductor material, the wafer having a first face supporting or for supporting at least one electronic component or circuit and an opposing second face which comprises:
 - 10 implanting atomic species through the second face and into the wafer to obtain a zone of weakness at a predetermined depth therein, the zone defining a first portion of the wafer extending from the zone to the first face and a remaining portion constituted by the remaining
15 portion of the wafer;
 removing the remaining portion from the first portion along the zone of weakness to thin the wafer; and
 repeating the implanting and removing steps until
20 the first portion has a reduced thickness that corresponds to a desired thickness for constituting a self-supported thin layer for the electronic component or circuit.
- 25 2. The method of claim 1, which further comprises thinning the wafer by a mechanical or chemical thinning method prior to the implanting of the atomic species.
- 30 3. The method of claim 1, which further comprises providing at least one electronic component or circuit on the first face of the wafer prior to the implanting of the atomic species.
- 35 4. The method of claim 1, wherein the remaining portion of the wafer is removed by applying a heat treatment or an external mechanical stress.

5. The method of claim 1, wherein the remaining portion of the wafer is removed by blowing a jet of fluid adjacent the zone of weakness.

5 6. The method of claim 1, wherein the remaining portion of the wafer is removed by scrubbing.

7. The method of claim 1, which further comprises applying a stiffener to the second face of the wafer
10 prior to removing the remaining portion by the application of a heat treatment or external mechanical stress.

8. The method of claim 7, which further comprises
15 applying the stiffener by deposition.

9. The method of claim 8, wherein the stiffener comprises a layer of silicon oxide.

20 10. The method of claim 7, wherein the stiffener comprises a rigid plate.

11. The method of claim 10, wherein the rigid plate comprises a monocrystalline or polycrystalline silicon
25 material or a glass.

12. The method of claim 7, wherein the stiffener comprises a flexible film.

30 13. The method of claim 7, wherein the stiffener comprises an adhesive film.

14. The method of claim 7, wherein the stiffener comprises a layer of wax.

35 15. The method of claim 1, which further comprises applying a stiffener to the first face of the wafer and

removing the stiffener after having obtained the self-supported thin layer prior to the removal of the remaining portion.

5 16. The method of claim 1, wherein the wafer comprises silicon.

 17. The method of claim 1, wherein the wafer comprises a silicon on insulator wafer.

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 18. The method of claim 1, wherein the wafer comprises germanium, an alloy of silicon and germanium, silicon carbide, gallium arsenide, indium phosphide, gallium nitride or aluminum nitride.

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 19. A method of thinning a wafer made of semiconductor material, the wafer having first and second opposing faces, which comprises:

 providing at least one electronic component or
20 circuit on the first face of the wafer;

 implanting atomic species through the second face and into the wafer to obtain a zone of weakness at a predetermined depth therein, the zone defining a first portion of the wafer extending from the zone to the first
25 face and a remaining portion constituted by the remaining portion of the wafer;

 removing the remaining portion from the first portion along the zone of weakness to thin the wafer; and

 if necessary, repeating the implanting and removing
30 steps until the first portion has a reduced thickness that corresponds to a desired thickness for constituting a self-supported thin layer for the electronic component or circuit.

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